



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/529,487

03/28/2005

Shinichi Musha

8007-1090

7924

466

7590

07/20/2009

YOUNG & THOMPSON

209 Madison Street

Suite 500

ALEXANDRIA, VA 22314

EXAMINER

ALEJANDRO, RAYMOND

ART UNIT

PAPER NUMBER

1795

MAIL DATE

DELIVERY MODE

07/20/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/529,487	Applicant(s) MUSHA ET AL.	
	Examiner Raymond Alejandro	Art Unit 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05/21/09.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3-6 and 8-31 is/are pending in the application.
- 4a) Of the above claim(s) 9-13 and 28-30 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 3-6, 8,14-27 and 31 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 March 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>07/09/09</u> . | 6) <input type="checkbox"/> Other: _____ |

Art Unit: 1795

DETAILED ACTION

Response to Amendment

This office action is responsive to the amendment filed 05/21/09. The applicant has overcome the objections and most of the 35 USC 112 rejections. The prior art rejections have not yet been overcome. Refer to the abovementioned amendment for specific details on applicant's rebuttal arguments and remarks. Thus, all pending claims are finally rejected over the same art as formulated hereinbelow and for the reasons of record:

Election/Restrictions and Claim Disposition

1. Claims 9-13 and 28-30 have been withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 10/20/08, 12/01/08 and the office action dated 01/23/09.

2. Claims 2 and 7 have been cancelled.

Information Disclosure Statement

3. The information disclosure statements (IDS) submitted on 07/09/09 was considered by the examiner.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Art Unit: 1795

5. Claims 1, 3-6, 8, 14-27 and 31 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

6. The language "low capability" and "higher capability" in claim 1, lines 5 and 8 is still considered to be a relative term which renders the claim indefinite. The terms "low" and "high" are not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. The extent or degree of the terms "low" and "high" are unknown. In this respect, it is noted that applicant's amendment or remark does not explain how such a rejection has been overcome, nor does it set forth how the language "low capability" and "higher capability" in claim 1 (lines 5 and 8) should be interpreted in light of the materially undefined-claimed materials.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 1, 3-6, 8, 14-20, 22-24, 27 and 31 are rejected under 35 U.S.C. 102(b) as being anticipated by the Japanese publication JP 2002-260637 (herein called the JP'637).

As to claims 1, 3, 8 and 31:

Art Unit: 1795

The JP'637 discloses a lithium secondary cell having a negative electrode comprising a current collector and, formed on the surface thereof, a layer of a mixture of active material particles containing silicon or silicon alloy, and a powder of an electro-conductive metal such as copper, wherein the powder of an electro-conductive metal is mixed in an amount of 50 wt % or less (P0019, 0023-0024, 0040-0048, 0062-0064 and 0078, and Abstract). Table 3 between paragraphs 0064-0065 shows the content of the electro-conductive material, particular amounts of 11.1 %, and 20 %, 33.3 %, and 50 % are reported (Table 3). The non-aqueous nature of the battery is discussed in paragraphs 0035-0036.

Figure 2 of the JP'637 illustrates the layered structure of the negative electrode comprising layers of different materials 12, 12a, 12b and 13 including, among others, the active material and the electro-conductive material:



FIGURE 2 above shows the nature of the layered structure of the negative electrode comprising layers of different materials 12, 12a, 12b and 13. It is useful to note that all layer materials reach or touch the current collector 11 (See FIGURE 2); and that materials 12, 12a, 12b and 13 are dispersed through the surface of the current collector, thus, they all penetrate through each other, and since the nature of those materials include at least a powdery material, it can be said that the powdery material itself comprises certain degree of porosity (FIGURE 2 and 5).

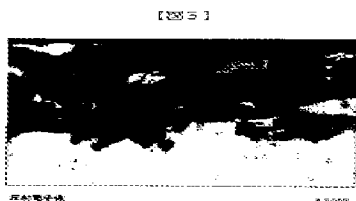
As to claim 4:

Art Unit: 1795

Table 3 between paragraphs 0064-0065 shows the content of the electro-conductive material, particular amounts of 11.1 %, and 20 % are reported (Table 3).

As to claims 5-6:

FIGURE 2 above shows the nature of the layered structure of the negative electrode comprising layers of different materials 12, 12a, 12b and 13. It is useful to note that all layer materials reach or touch the current collector 11 (See FIGURE 2); and that materials 12, 12a, 12b and 13 are dispersed through the surface of the current collector, thus, they all penetrate through each other, and since the nature of those materials include at least a powdery material, it can be said that the powdery material itself comprises certain degree of porosity (FIGURE 2 and 5).



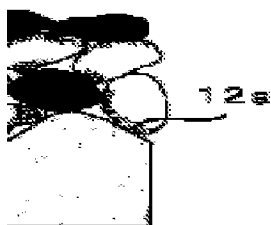
As to claim 14-15 and 22-24:

JP'637 discloses particle sizes and thicknesses of the electrode active materials including 10 μm , 50 μm , 100 μm (0024, 0027, 0040, 0049, 0053); and 20 μm (P0042). Additionally, TABLE 4 also illustrates dimensional magnitudes including 50 μm or 3 μm , and 15 μm or 3 μm (See TABLE 4). The specific oxygen concentration is considered to be an inherent property or characteristic of layered structure of the negative electrode according to the exposure of oxygen. *Note that the present claim does not recite that oxygen atoms are combined with silicon or any other active material.*

As to claim 16:

Art Unit: 1795

The current collector of the JP'637 does include copper (Abstract). *Thus, it is contended that at the interface between the current collector made of copper and the active material layers, there is an interfacing coating layer containing at least copper due to the chemical interaction taking place at that location. Note that the present claim does not require that the at least one element be uniformly mixed or blended with the coating layer. Thus, it is not unreasonable to conclude that certain amount of copper disintegrate from the current collector due to the chemical interaction, and such a copper amount is freely distributed throughout the active material layers (See enlarged portion of FIGURE 2 below for a better visualization).*



As to claims 17-20 and 27:

JP'637 discloses a layered structure of the negative electrode comprising layers of different materials (FIGURE 2/Abstract). *Note that any one of those layers can taken as the surface coating layer.*

There is disclosed a conductive metal foil 11 such as a copper foil or copper alloy foil (Abstract).

Note: As to the method limitation, [i.e. “formed by electroplating, sputtering, CVD, PVD or rolling (claims 17-19); or formed of electrolytic metal foil (claim 27)], it is noted that a method limitation incorporated into a product claim does not patentable distinguish the product because what is given patentably consideration is the product itself and not the manner in which

Art Unit: 1795

the product was made. Therefore, the patentability of a product is independent of how it was made. As a result, the process steps of a product-by-process claim do not impart any significant property or structure to the claimed end product. And, if there is any difference, the difference would have been minor and obvious. Determination of patentability of a product-by-process claim is based on the scope of the product itself.

“[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product by process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process.” In re Thorpe 777 F.2d 695, 698, 227 USPQ 964,966 (Fed Cir. 1985) and MPEP 2113.

Thus, the present claims are anticipated.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Art Unit: 1795

11. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

12. Claim 21 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over the Japanese publication JP 2002-260637 (herein called the JP'637) as applied to the immediately preceding claims, and further in view of Sato et al 6589690.

The JP'637 is applied, argued and incorporated herein for the reasons expressed above. However, the preceding reference does not expressly disclose the specific thickness and porosity of the current collector and slurry containing the active material applied to a current collector surface.

Sato et al disclose a secondary battery comprising a non-aqueous electrolyte (Abstract/COL 2, lines 50-60). Sato et al disclose the use of tin-based or silicon-based material for negative electrodes (COL 10, lines 13-30) and a collector being a conductive substrate of a porous structure made of copper, among other, wherein the thickness thereof is in the range of 5-20 μm (COL 8, lines 47-6). Sato et al further disclose that negative active material is prepared to form a slurry which is coated on both surfaces of a collector made of a porous copper foil current collector having a thickness of 15 μm and having a large number of pores 0.5 mm (500

Art Unit: 1795

μm) in diameter which are distributed at a ratio of 10 per 10 cm² (COL 47, lines 30-39 & COL 39, lines 42-52).

In view of the above, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to make the current collector of the JP'637 by having the specific thickness and porosity of the current collector and slurry containing active material applied to a current collector surface of Sato et al as Sato et al teach that disclosed technique and characteristics assists in providing an effectively uniformly coated current collector, and ensure a sufficiently high mechanical strength of the negative electrode while properly suppressing the weight of the negative electrode. With respect to the specific pore size and/or distribution, where the only difference between the prior art and the claims is a recitation of relative dimensions (*changes in size/proportion*) of the claimed feature and a feature having the claimed relative dimensions would not perform differently than the prior art device/element/member, the claimed device/element/member is not patentably distinct from the prior art device//element/member. That is, limitations relating to the size of the feature/element/member are not sufficient to patentably distinguish over the prior art as it is noted that changes in size is a matter of choice which a person of ordinary skill in the art would have found obvious absent persuasive evidence that the particular size of the claimed *pore* is significant. In re Rose 105 USPQ 237; In re Rinehart 189 USPQ 143; In Gardner v. TEC Systems, Inc., 220 USPQ 777 & 225 USPQ 232, (See MPEP 2144.04 [R-1] Legal Precedent as Source of Supporting Rationale)

13. Claim 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over the Japanese publication JP 2002-260637 (herein called the JP'637) as applied to the immediately preceding claims, and further in view of Barriere et al 2002/0168569.

Art Unit: 1795

The JP'637 is applied, argued and incorporated herein for the reasons expressed above. However, the preceding reference does not expressly disclose the specific current collector.

In paragraph 0076 of Barriere et al, there is disclosed a metal collector made of metal foils or metal grids or metal foams made of copper, aluminum, nickel or metal alloys. These metal substrates may possibly be treated so as to promote the adhesion of the films (0076). The disclosure of Barriere et al is directly related to a lithium-ion battery (Title/Abstract).

In view of the above, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to use the specific current collector of Barriere et al in the negative electrode of the JP'637 because Barriere et al teaches that such a foam metal material provides the benefit of promoting adhesion of the film/layer of the active material. Thus, it improves the mechanical stability of the electrode structure.

Response to Arguments

14. Applicant's arguments filed 05/21/09 have been fully considered but they are not persuasive.

15. The main contention of applicant's arguments is premised on the assertion that "*JP'637 does not teach or suggest the claimed surface coating layer having the micropores extending in the thickness direction of the surface coating layer and allowing a non-aqueous electrolyte to pass therethrough*". In response, the examiner likes to point out that by arguing: a) "the micropores"; b) "the thickness direction"; c) "allowing a non-aqueous electrolyte to pass through"; d) the effect of "pulverization" and e) "prevention of fall-off", applicant appears to suggest that the invention in question is calling for, in a positive manner, a surface coating layer

Art Unit: 1795

in physical contact with the active material layer and opposite to the side of the active material layer facing the current collector and wherein the surface coating layer is continuously formed thereon for fully covering or enclosing the material(s) of the active material layer and allowing the electrolyte to pass through. However, such a limitation, effect or implicit connotation is far from being currently claimed. The main issue here is that applicant appears to be arguing something that is not even remotely recited in the present claims. For instance, there is no way to decipher the specific placement of the surface coating layer, whether or not it is disposed external to the active material layer and opposite to the current collector, internal to the active material layer and next to the current collector, in direct physical contact with the surface coating layer, between the active material layer and the current collector or the claimed particles and the like. So, applicant's claimed invention is far from claiming a well or clearly defined electrode structure capable of distinguishing over the prior art of record.

All in all, **Figure 2** of the JP'637 illustrates the layered structure of the negative electrode comprising layers of different materials 12, 12a, 12b and 13 including, among others, the active material and the electro-conductive material:

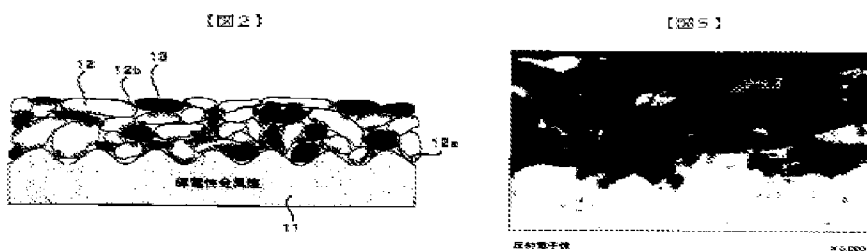


FIGURE 2 above shows the nature of the layered structure of the negative electrode comprising layers of different materials 12, 12a, 12b and 13. It is useful to note that all layer materials reach or touch the current collector 11 (See FIGURE 2); and that materials 12, 12a, 12b

Art Unit: 1795

and 13 are dispersed through the surface of the current collector, thus, they all penetrate through each other, and since the nature of those materials include at least a powdery material, it can be said that the powdery material itself comprises certain degree of porosity (FIGURE 2 and 5).

As such, it is not unreasonable to set forth that the electrode structure of the prior art containing exactly the same components: a current collector, an active material layer, particles and another set of non-continuous particles covering the active material layer still reads on applicant's claimed electrode having an undefined structure or arrangement. Further, there is no way to decipher whether the active material layer is made of the active material particles per se, whether the active material layer includes the active material particles in addition to other components; whether the surface coating layer is made of the active material particles or of the material used to make the active material or the like. Thus, the foregoing issues are still unclear and unresolved for purposes of patentability. Yet further, it can be said that the discontinuities of either particles 12 or 13 in FIGURE 2 of the prior art positively form “a porous structure” for covering the internal layer or internal particles in FIGURE 2. It can be said that “the porous structure” is the product of the alignment of those particles on the top surface of the electrode body where such particles are so dimensioned (i.e. in the order of micro-sizes). Thus, their respective discontinuities form opening, pores or gaps of about the same dimension.

16. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., “*pulverized*” and “*preventing fall-off*”) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). (**emphasis**

Art Unit: 1795

added→) Thus, applicant's arguments are not commensurate in scope with the presently claimed invention. By arguing the effect of "pulverization" and "prevention of fall-off", one more time, applicant appears to suggest that the invention in question is providing a surface coating layer in physical contact with the active material layer and opposite to the side of the active material layer facing the current collector and wherein the surface coating layer is continuously formed thereon for fully covering or enclosing the material(s) of the active material layer. However, such a limitation, effect or implicitly connotation is far from being currently claimed.

17. With respect to the unexpected result of "extended life" and its implication, it is noted that evidence of secondary consideration are irrelevant to a 102 analysis or a rejection under Section 102. *"Arguments that the alleged anticipatory prior art is nonanalogous art or teaches away from the invention or is not recognized as solving the problem solved by the claimed invention, [are] not germane to a rejection under section 102."* Twin Disc, Inc. v. United States, 231 USPQ 417, 424 (Cl. Ct. 1986) (quoting In re Self, 671 F.2d 1344, 213 USPQ 1, 7 (CCPA 1982)). See also State Contracting & Eng'g Corp. v. Condotte America, Inc., 346 F.3d 1057, 1068, 68 USPQ2d 1481, 1488 (Fed. Cir. 2003). *See MPEP 2131.05 Nonanalogous or Disparaging Prior Art.*

18. With respect to the 112 issue, it is noted that applicant's amendment or remark does not explain how such a rejection has been overcome, nor does it set forth how the language "low capability" and "higher capability" in claim 1 (lines 5 and 8) should be interpreted in light of the materially undefined-claimed materials. The extent or degree of the terms "low" and "high" are still unknown and open to interpretation.

Conclusion

19. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Raymond Alejandro whose telephone number is (571) 272-1282. The examiner can normally be reached on Monday-Thursday (8:00 am - 6:30 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1795

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Raymond Alejandro/
Primary Examiner, Art Unit 1795